

CLAIMS:

1. A genetic construct comprising a conditionally lethal gene operably associated with a promoter functional in a plant cell, said gene being used to select, identify or selectively
5 kill a plant expressing said gene.
2. A genetic construct comprising:

a conditionally lethal first gene adapted for expression in a plant cell; and,

a second gene adapted for expression in a plant cell;

10 wherein either or both gene is operably associated with a promoter functional in a plant cell.
3. The construct of claim 2, wherein the second gene is heterologous.
4. The construct of claim 3, wherein the heterologous
15 gene codes for a pharmaceutical product.
5. The construct of claim 3, wherein the heterologous gene codes for an industrially useful enzyme.
6. The construct of claim 3, wherein the heterologous gene codes for rennin and/or hirudin.
- 20 7. The construct of claim 2, wherein the second gene, when expressed, changes the phenotype of the plant.
8. The construct of claim 2, wherein the second gene codes for a protein, peptide or anti-sense RNA.
9. The construct of claim 2, wherein the second gene
25 codes for an input or output trait.

10. The construct of claim 1 or claim 2, wherein the conditionally lethal gene is an oncogene.

11. The construct of claim 1 or claim 2, wherein the conditionally lethal gene is oncogene 2 from *Agrobacterium tumefaciens*.
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12. The construct of claim 1 or claim 2, wherein the conditionally lethal gene is expressed in response to chemical or stress.

13. The construct of claim 1 or claim 2, wherein the conditionally lethal gene is lethal only when an exogenous substance is applied.
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14. The construct of claim 1 or claim 2, wherein the conditionally lethal gene is lethal when it is expressed and no exogenous substance need be applied.

15. The construct of claim 1 or claim 2, wherein the conditionally lethal gene is oncogene 4, a low temperature inducible gene from *Arabidopsis*, the gene coding for methoxinine dehydrogenase, the gene coding for rhizobitoxine synthase, or the gene coding for phosphonate monoester
15
20 hydrolase.

16. The construct of claim 13, wherein the conditionally lethal gene is the gene coding for methoxinine dehydrogenase, the gene coding for rhizobitoxine synthase, or the gene coding for phosphonate monoester hydrolase.

25 17. The construct of claim 1 or claim 2, wherein the promoter is inducible.

18. The construct of claim 1 or claim 2, wherein the promoter is tissue-specific.

19. The construct of claim 1 or claim 2, wherein the promoter is constitutive.

20. A plant transformation vector comprising the genetic construct of any one of claims 1 to 19.

5 21. A plant comprising the genetic construct of any one of claims 1 to 20.

22. A plant comprising the genetic construct of any one of claims 11, 12, 13 and 15.

23. A plant transformed with the vector of claim 20.

10 24. The plant of any of claims 21 to 23 which is Brassica.

25. The Brassica plant of claim 24 which has altered oil composition.

15 26. The Brassica plant of claim 25 which has high oleic, low linoleic acid genotype.

27. The Brassica plant of claim 26 which is variety AG-019 or derivatives thereof.

28. A method for producing a transgenic plant which can be removed from a growing environment, comprising:

20 transforming a plant cell with the genetic construct or vector of any one of claims 1 to 20; and,

regenerating the plant cell to a whole plant.

29. A method for removing the plant of claim 22 from a growing environment, comprising application of a chemical agent
25 which is converted to a phytotoxic agent by a product of a conditionally lethal gene, wherein the agent is applied at a

level which, upon conversion by the gene product, results in a sub-lethal level of converted substrate.

30. A method for visual identification of the plant of claim 22, comprising:

5 application of a chemical agent which is a substrate of the product of the conditionally lethal gene, wherein the agent is applied at a level which, upon conversion by the gene product, results in a sub-lethal level of converted substrate;

10 visually identifying the plants which manifest the sub-lethal phenotype.

31. The method of claim 29 or claim 30 wherein the genetic construct or vector comprises oncogene 2 as the conditionally lethal gene, and wherein the chemical agent is an indoleamide or a related derivative.

15 32. The method of claim 31 wherein the indoleamide is naphthalene acetamide.

33. A method for selecting a transgenic plant of claim 22, comprising:

20 application of a chemical agent which is a substrate for the product of the conditionally lethal gene, wherein the agent is applied at a level which, upon conversion by the gene product, results in a sub-lethal level of converted substrate;

visually identifying the plants which manifest the sub-lethal phenotype; and,

25 allowing the identified plants to recover into normal plants in the absence of the chemical agent.

34. The method of claim 33 wherein the genetic construct or vector comprises oncogene 2 as the conditionally lethal

gene, and wherein the chemical agent is an indoleamide or a related derivative.

35. The method of claim 34 wherein the indoleamide is naphthalene acetamide.

5 36. The method of any one of claims 29 to 35 wherein the plant is Brassica.

37. The method of claim 36 wherein the Brassica plant has altered oil composition.

38. The method of claim 37 wherein the Brassica plant has
10 high oleic acid, low linoleic acid content.

39. The method of claim 38 wherein the Brassica plant is variety AG-019 or derivatives thereof.

40. A method for visual identification of a germinating
seed or plant embryo comprising oncogene 2 as a transgene,
15 comprising:

culturing the seed or embryo on a medium containing an indoleamide or a related derivative; and

visually identifying the germinated seed or embryo which manifests the phenotype.

20 41. A method for selecting a germinating seed or plant embryo comprising oncogene 2 as a transgene, comprising:

culturing the seed or embryo on a medium containing an indoleamide or a related derivative;

visually identifying the germinated seed or embryo which
25 manifest the phenotype; and,

transferring the identified seed or embryo to a medium without indoleamide;

thereby obtaining the germinating seed or plant embryo comprising oncogene 2 as a transgene.

42. The method of claim 40 or 41 wherein the medium of step (a) contains an auxin transport inhibitor and the medium of step (b) does not contain an auxin transport inhibitor.

43. The method of any one of claims 40 to 42, wherein the inhibitor is N-(1-naphthyl)phthalamic acid; 2,3,5-triiodobenzoic acid; 9-hydroxyfluorene-9-carboxylic acid; erythrosine; eosine; fluorescein; semicarbazone; or ethanphon.

44. The method of any one of claims 40 to 43, wherein the indoleamide is naphthalene acetamide and the inhibitor is naphthylphthalamic acid.

45. The method of any one of claims 40 to 44, wherein the seed or embryo is Brassica.

46. The method of claim 45, wherein the Brassica seed or embryo has altered oil composition.

47. The method of claim 46, wherein the Brassica seed or embryo has high oleic acid, low linoleic acid content.

48. The method of claim 47, wherein the Brassica seed or embryo is variety AG-019 or derivatives thereof.

49. A method for selecting a transgenic plant cell during transformation, comprising:

transforming a plant cell with a genetic construct or vector comprising an oncogene adapted for expression in a plant cell;

exposing said plant cell to a formula comprising a benign auxin derivative of a plant hormone, which is converted into an active hormone by the product of the oncogene, and an auxin transport inhibitor;

culturing the cell to form a group of cells;

visually identifying the group of cells which manifests the phenotype associated with the active hormone; and,

allowing the identified group of cells to recover in the
5 absence of the derivative.

50. The method of claim 49, wherein the oncogene is oncogene 2.

51. The method of claim 49, wherein the benign derivative is naphthalene acetamide and the inhibitor is
10 naphthylphthalamic acid.

52. The method of any one of claims 49 to 51, wherein the plant cell is Brassica.

53. The method of claim 52 wherein the Brassica plant cell has altered oil composition.

15 54. The method of claim 53 wherein the Brassica plant cell has high oleic acid, low linoleic acid content.

55. The method of claim 54 wherein the Brassica plant cell is variety AG-019 or derivatives thereof.

20 56. A method for transforming Brassica napus, comprising inclusion of naphthalene acetic acid in the media at the callusing and recovery step.

57. The method of claim 56 wherein the Brassica napus has altered oil profile.

25 58. The method of claim 56 wherein the Brassica napus is variety AG-019.

59. A plasmid selected from the group consisting of: pJH121, pJH122, pJH123, pJH125, pJH126, and pJH130.